

Charts X to XV show the conditions from the 22d to the 27th, inclusive, when from the 22d to 24th a tropical disturbance invaded the Atlantic coast of the United States, the storm area extending as far north as Nantucket on the latter date, while from the 23d to 27th the eastern section of the ocean was swept by violent gales. Storm logs:

American S. S. *D. G. Scofield*:

Gale began at 4 p. m. on the 21st, wind NNE. Lowest barometer 29.70 inches at 2 p. m. on the 23d, wind NE., 8, in latitude 38° 30' N., longitude 73° 50' W. End at 6 p. m. on the 23d, wind NE. Highest force of wind 11, NE.; wind from NNE.-NE.

American S. S. *Sinsinawa*:

Gale began on the 22d, wind NE. Lowest barometer 29.75 inches at midnight on the 22d, wind NE., in latitude 39° 18' N., longitude 72° 20' W. End on the 23d, wind NE. Highest force of wind 9, NE.; steady NE.

American S. S. *Miller County*:

Gale began on the 23d, wind NE. Lowest barometer 29.77 inches at 5 a. m. on the 23d, wind NE., 9, in latitude 38° 48' N., longitude 75° 01' W. End on the 24th, wind NE., 7. Highest force of wind 10, NE.; steady NE.

American S. S. *Minnequa*:

Gale began on the 23d, wind NW. Lowest barometer 29.46 inches at 3 p. m. on the 23d, wind NW., in latitude 49° 30' N., longitude 28° W. End on the 28th, wind NW. Highest force of wind 10, NW.; shifts not given.

American S. S. *Balsam*:

Gale began on the 23d, wind NW. Lowest barometer 28.68 inches at 10 p. m. on the 26th, wind NW., 10, in latitude 51° N., longitude 19° W. End on the 27th, wind NW. Highest force of wind 10, NW.; shifts NW.-NE.-NW.

British S. S. *Camito*:

Gale began on the 26th, wind WSW. Lowest barometer 29.63 inches on the 26th, wind NNW., 9, in latitude 40° 40' N., longitude 25° 20' W. End on the 27th, wind N. Highest force of wind, 9, NNW.; shifts NW.-N.-NNE.

British S. S. *Devonian*:

Gale began on the 26th, wind S. Lowest barometer 28.56 inches on the 26th, wind S., 7, in latitude 51° 32' N., longitude 18° 07' W. End on the 29th, wind NW. Highest force of wind 10; shifts SSW.-NNW (12 points). On the 27th wind backed to S., 8, after blowing hard from NW., 10. Remarkable fluctuation of the barometer was noticed.

American S. S. *West Celina*:

Gale began on the 26th, wind WSW. Lowest barometer 28.51 inches at 9 a. m. on the 27th, wind SSW., 6, in latitude 51° 15' N., longitude 4° W. End on the 28th. Highest force of wind 9; shifts SSW.-W.

On the 27th there was a well defined low central near latitude 46° N., longitude 48° W.; this moved rapidly northeastward and on the 31st was in the vicinity of Ireland.

On the 28th and 29th a large storm area covered the central part of the ocean and a few reports were received denoting moderate gales on the 28th near the 10th meridian, west longitude, between the 35th and 50th parallels.

On the 30th the stormy weather was confined to the region between the 48th and 58th parallels and the 15th and 27th meridians.

On the 31st although there was no well-developed disturbance, several vessels in widely scattered localities reported gales. Storm logs:

British S. S. *Ariano*:

Gale began on the 28th, wind N. Lowest barometer 28.65 inches at 2 p. m. on the 28th, wind N., 8, in latitude 53° 20' N., longitude 43° 14' W. End on the 29th, wind NNW. Highest force of wind 9; steady N.

American S. S. *Docket*:

Gale began on the 28th, wind SW., 5. Lowest barometer 29.90 inches at 8 a. m. on the 28th, wind SW., 8, in latitude 35° N., longitude 40° W. End at 8 p. m. on the 28th, wind N. Highest force of wind 8; shifts SW.-N.

British S. S. *Caledonian*:

Gale began on the 28th, wind SW. Lowest barometer 28.75 inches at 7 a. m. on the 29th, wind WSW., 7, in latitude 54° 16' N., longitude 27° 15' W. End on the 30th, wind W. Highest force of wind 9; shifts SW.-WSW.-W.

British S. S. *Galtymore*:

Gale began on the 29th, wind SSW. Lowest barometer 28.59 inches at 4 a. m. on the 30th, wind SW., 8, in latitude 58° 20' N., longitude 17° 30' W. End on the 31st, wind W. Highest force of wind 10; shifts SW.-W.

On the 31st the American S. S. *Montgomery City* encountered a northeasterly gale near the Azores. Storm log:

Gale began on the 31st, wind ENE. Lowest barometer 29.66 inches at 6 a. m. on the 31st, wind ENE., in latitude 36° 31' N., longitude 28° 08' W. End on November 1, wind NNE., 8. Highest force of wind 8, NNE.; shifts WNW.-ENE.

On the 31st at Greenwich mean noon, the American S. S. *Coelleda* reported a moderate SSW. wind that afterwards developed into a gale as shown by following storm log:

Gale began on the 31st, wind SSW. Lowest barometer 30.05 inches at 8 a. m. on the 31st, wind SSW., 7, in latitude 40° 35' N., longitude 63° 30' W. End on November 2, wind SSW. to N. Highest force of wind 10, SSW.; shifts SSW.-WNW.

NORTH PACIFIC OCEAN.

By WILLIS E. HURD.

Rough weather set in unmistakably over the northern portion of the North Pacific Ocean during October, following the premonitory gales that swept these waters during the last decade of September. Throughout the month the Aleutian low surged backward and forward with intense energy along the 55th parallel, its centers of action being generally well developed to the eastward or to the westward of the Alaskan Peninsula. In the Gulf of Alaska especially, and to the southward, terrific bursts of weather occurred on several dates, and shipping was buffeted about by strong gales to hurricane winds and mountainous seas. In the Far East tropical storm conditions occurred, and full hurricane winds were encountered on the 10th and 11th by vessels to the southward and eastward of Japan.

The North Pacific high was generally well developed during the month, and no depressions seem to have developed in low latitudes within the extent of its usual area, although low pressure on several days, more particularly on the 11th, extended far southward from the Aleutian center.

The barometric distribution over the eastern part of the ocean was thus characterized by extraordinarily low pressure in the vicinity of the Aleutians and by high pressure in the near-by region of Midway Island. The average pressure at Dutch Harbor, which may be taken to represent the Aleutian region, was 29.29 inches (p. m. observations), or 0.41 inch below the normal. So far as available records show, this is the lowest pressure that has been recorded at Dutch Harbor in the month of October. Previous low values, in a record more or less fragmentary prior to 1916, are as follows: 1922, 29.48 inches; 1914, 29.56 inches; 1885, 29.41 inches. Readings recorded at the p. m. observation show that the barometer rose to

normal or above on but two days during the month. An interesting comparison may be made between pressure at Dutch Harbor and at Lerwick, Shetland Islands. At Lerwick the average for the month, based on 1 p. m. observations, was 29.35 inches, or some 0.43 inch below the normal. Thus the departures at the two stations were practically identical. The highest pressure recorded at Dutch Harbor, considering both a. m. and p. m. observations, was 29.82 on the 26th and 27th; the lowest, 28.56, on the 12th. Absolute range, 1.26 inches. At Midway Island the average pressure, based on p. m. observations, was 30.10 inches, or 0.08 inch above the average. This is the highest pressure recorded in October since the beginning of observations in 1912. The highest reading, 30.26, was recorded on the 31st; the lowest, 29.80, on the 11th. The average pressure fall from Midway Island to Dutch Harbor in October is 0.32 inch, in a distance of 1,653 nautical miles, but in the month under consideration it rose to 0.81 inch. At Honolulu pressure was practically normal at 30 inches. The highest reading, 30.09, was recorded on the 14th; the lowest, 29.83, on the 11th.

At Honolulu the average wind velocity for October was 9 miles an hour, which is the highest for the month, excepting October, 1915, since the establishment of the station. The last five days were exceptionally windy, and the highest velocity for the month, 35 miles from the northeast, occurred on the 27th.

As gathered from the available records, two typhoons appeared over Oriental waters during the month. Our only information concerning the first appears in the report of the British S. S. *Tuscalusa* as a transcription of messages received by that vessel. This typhoon was first reported on September 26, in latitude 20° N., longitude 130° E., moving northwestward. On October 1 its center was reported as being near 27° N., 124° E., moving slowly west-northwestward, condition violent. On the 2d it moved inland between Wenchau and Foochow. On the same day rough weather occurred north of Taiwan (Formosa), and strong northerly winds covered the Yellow Sea, caused by the powerful anticyclone over northern China.

On October 7 a typhoon was reported to the eastward of the Philippine Islands. One vessel, the American S. S. *Sakina*, came within its influence in 15° 45' N., 129° 20' E., experiencing west-southwesterly to southerly winds, highest force 8, lowest pressure 29.42. On the 8th it lay somewhere to the eastward of the Riu-Kiu group of islands, the 8 p. m. observation at Naha showing the wind to be northeast, force 7, pressure 29.34. The American S. S. *West Carmona*, eastward bound from Hongkong, while in latitude 22° 12' N., longitude 121° 21' E., on this date, experienced a north-northeasterly wind, force 11, lowest observed pressure 29.56 inches. No information is at hand concerning the progress of the storm on the 9th, but on the 10th and 11th several vessels in Japanese waters reported strong cyclonic conditions.

On the 10th the Japanese S. S. *Kinkasan Maru*, in 33° 35' N., 136° 06' E., experienced northeasterly to northwesterly gales, force 10, lowest pressure 29 inches. The American S. S. *President McKinley*, in 35° N., 141° E., experienced a south-southwesterly gale, force 9, lowest pressure 29.39. The Japanese S. S. *Kiyo Maru* encountered similar weather, beginning with a southeasterly gale and falling barometer at 8 a. m. At 2 p. m. the observed pressure was at its lowest, 29.20 inches, highest wind force, 10 from the north, in 38° 15' N., 151° 15' E. The Japanese S. S. *Oridono Maru* reported a northwesterly gale, force 10, lowest pressure 28.82, in

33° 10' N., 135° 35' E. The American S. S. *Bakersfield* experienced a gale from the north, force 11, pressure 28.90 inches, in 35° 02' N., 136° 49' E. The Norwegian S. S. *Luise Nielsen* seems to have been among the most heavily involved in this storm. She first ran into an east-northeasterly gale, force 10, but later ran into a full hurricane wind from the west, lowest pressure 28.48 inches, in 34° 33' N., 138° 58' E. The American Army transport *U. S. Grant*, eastward bound, likewise encountered the hurricane winds, the shifts being from south-southwest to northwest, highest velocity 12, SSW., lowest pressure 29.01, in 38° 02' N., 153° 08' E. Stormy weather was also experienced simultaneously as far north as the 45th parallel and as far east as the 175th meridian of east longitude.

Strangely enough, similarly intense conditions prevailed over a considerable portion of the northeastern part of the ocean on the same dates—10th and 11th—and extending into the 12th, thus practically sweeping the entire northern route with a chain of gales that at times, both east and west, attained the maximum force.

Of the more northern storms that appeared over the waters to the westward of the 180th meridian during the month, those of the 3d and 4th, and the 25th, were the most important.

The American steamships *Bakersfield* and *West Cayote* were involved in the disturbance of the 3d and 4th near latitude 45° N., longitude 155° E. The *West Cayote*, westward bound, during four hours on the 3d observed shifts of the wind from east through south to west-northwest, highest force 10 from the west-southwest, lowest pressure 29.18. The highest wind observed by the *Bakersfield* was 9 from the west, lowest pressure 29.22.

On the 25th the American S. S. *Dewey*, Portland toward Yokohama, during a voyage in which a considerable amount of rough weather had already been passed through, ran into a southeast gale, force 11, lowest pressure 29.58 inches, in latitude 46° 40' N., longitude 160° 20' E.

East of the 180th meridian, in higher latitudes, the weather seems to have been somewhat rougher than to the west of it, owing to the more frequent eastward bearing of the Aleutian center of action.

The following vessels reported heavy weather in the northern part of the Gulf of Alaska: American S. S. *Dellwood*: Gales between the 61st to 58th parallels, 146th to 138th meridians, on the 2d to 6th, highest wind force 11, from the east-northeast, on the night of the 4th-5th, lowest pressure 29.54. On the 18th to the 23d, heavy rain squalls near 60° N., 146° 30' W., with frequent easterly to southeasterly gales, highest force 10, lowest pressure 29.50, on the 23d. American S. S. *Northwestern*: In port at Cordova and Latouche, on the 12th and 13th: "Heavy wind and rain squalls, attaining hurricane force from the SE. at times; lowest pressure 28.89 on the 13th."

Near the 50th parallel reported gales and pressures below 29 inches began with the 3d and continued through two-thirds of the month. Some vessels noted several gale periods during a passage, and others told the story of continuous buffetings about by wind and wave for days at a time. Prior to the 10th only one vessel reported gales of force higher than 10. That was the Japanese S. S. *Ayaha Maru* which, on the 9th, in latitude 49° 20' N., longitude 149° 35' W., ran into the teeth of a southeaster, force 11, pressure 28.90 inches. During the week which ended on the 10th the lowest observed pressures were 28.56 inches, read on board the American S. S. *West Niger*, in 50° 35' N., 167° 20' W., and 28.64

inches, on board the Canadian S. S. *City of Victoria*, in 51° 40' N., 167° 54' W., both on the 6th. The lowest pressure reported by a land station in the Gulf of Alaska during this period was 28.74 inches, at Kodiak, p. m. of the 4th.

The most intense manifestation of the Aleutian Low was that which began on the 10th and extended far to the southward on the 11th and 12th. On the 12th, hurricane wind velocities and extraordinarily low pressures developed, centering very nearly about latitude 50° N., longitude 149° W., and extending for several degrees in all directions. The point given was the scene of lowest barometer, 27.89 inches (uncorrected), read on board the American S. S. *City of Spokane*, Manila toward Seattle. Said the observer, Mr. G. van Haute:

From 29.07, noon on 11th, barometer fell rapidly with wind increasing from easterly, until 3 a. m. 12th, barometer was 27.89, wind ESE., force 10. During the gale wind shifted continuously between NE. and SSE., tremendous sea running.

The pressure read from the barometer of the Japanese S. S. *Ayaha Maru*, about 30 miles to the westward of the *City of Spokane's* position, was 27.91 (corrected), at 2:30 a. m. of the 12th, during a southeast hurricane. Later in the day the wind shifted to southwest, still blowing with hurricane force, but soon moderating.

During the 12th the American S. S. *Buford*, Capt. C. Noren, bound from San Francisco toward Nome, was in latitude 52° 40' N., longitude 149° W. The observer, Mr. C. F. May, made the following note:

From 4 a. m. to 6 a. m. barometer lowest at 28.45 (corrected); SE. hurricane. Vessel hove to from 6:05 to 9:50 a. m. Helm would not answer. Hove to again until 10:52 a. m.; 8 a. m. barometer started to rise; wind SE. 9; sea phenomenal. At 12 noon barometer 28.83 and still rising; wind SE. 6; high rollers with steep front.

In 51° 38' N., 145° W., the American S. S. *Dewey*, westward bound, encountered a whole gale from the south-southeast during the morning hours, lowest pressure 28.74 inches. The American S. S. *West Jessup*, at 1 a. m. of the 12th, while in 51° 51' N., 145° 17' W., experienced a southeasterly gale, force 10, lowest pressure 28.57 inches.

On October 15 at 8 p. m. a storm center appeared near 50° N., 135° W., and entered the Washington coast during the night. The Japanese S. S. *Ayaha Maru*, at 8 p. m. of the 15th experienced a northwesterly gale, force 9, in 48° 52' N., 133° 50' W., with an accompanied pressure as low as 28.61 inches. The Weather Bureau station at Tatoosh Island recorded a maximum velocity of 65 miles from the southwest, lowest pressure 28.97 inches, during the early morning of the 16th. This station during the entire month had 10 days with wind velocities equalling or exceeding 40 miles an hour.

Under date of October 22, the San Francisco (Calif.) Examiner reported the arrival in port of the Japanese freighter *Atlas Maru*, after an 8-day battle with storm winds which began when the vessel was about 2,000 miles from San Francisco. This item alone bespeaks the turbulent conditions which prevailed over the northeastern Pacific during that period.

On the 23d the American S. S. *President Madison* experienced a gale the maximum force of which was 10 from the west, in 50° 05' N., 179° 05' W., lowest pressure 29.38.

At this time the energy of the Aleutian Low was shifting into east longitudes, and thenceforth to the end of the month only moderate gales occurred to the eastward

of the 180th meridian. At the close of the month high pressure covered the greater part of the ocean in middle latitudes, and low pressure was central over western Alaska and Bering Sea.

In tropical latitudes of the eastern Pacific gales were reported upon several occasions, some associated with low and some with high pressure. On the 5th and 6th, while a shallow Low occupied the region of western Mexico and adjacent waters, the French S. S. *Texas*, southward bound, ran into a northeasterly gale, force 9, lowest pressure 29.62, in 19° 14' N., 105° 20' W. On the morning of the 6th the wind changed to south-southwest and diminished. The American S. S. *Cecil County*, in 17° 37' N., 104° 05' W., on the 5th, experienced an easterly gale, force 9, with accompanying rough, confused seas.

From the 11th to the 16th gales occurred off Champerico and in neighboring waters, a south wind, force 7, being reported as far south as 11° 19' N., 90° 20' W., pressure 29.82 inches, on the 16th. The highest force observed during the period was 9 from the west-northwest, lowest pressure 29.74 inches, noted by the American S. S. *Corinto* while in port at Champerico, on the 16th. On the 16th and 17th a southwest gale, force 8, was experienced by the American S. S. *E. L. Doheny III*, while off Bone Island, Panama. The same vessel on the 21st ran into a strong northerly gale, force 9, in the Gulf of Tehautepec.

There seems to have been less fog over the ocean than during September. However, it was observed on 13 days over that portion of the sailing routes in east longitude, extending between the 40th and 50th parallels, and the 160th and 180th meridians. Fog was reported for 6 days outside of San Francisco Harbor, and on 4 days near 50° N., 140° W., thence southeastward to the coast.

NOTE.

The American S. S. *Levant Arrow*, Capt. P. Muller, Observer Robert Brodel, Panama toward San Francisco, reported the following:

Waterspout October 16, 9 a. m., latitude 17° 35' N., longitude 103° 15' W. Sighted on our beam N. 26 E., 4 miles off, a whirl of water; and about 2 minutes later a small waterspout began to descend very rapidly from a cumulo-nimbus cloud. While descending to a visible contact with the whirl, it grew to a huge waterspout traveling slowly with the cloud eastward, having a 5° incline and dragging the base along until it disappeared on our quarter. Wind at the time west, force 3, pressure 29.82. Weather clear. Over the coast heavy clouds forming.

CYCLONIC DISTURBANCES IN THE SOUTH PACIFIC OCEAN.

By ALBERT J. McCURDY, JR.

Weather reports received from vessels that were in the South Pacific Ocean in October, 1923, indicate that stormy conditions prevailed off the southern coast of Chile and in the vicinity of Raratonga at the beginning of the month.

The British S. S. *Corinthic*, Capt. Frank Hart, Wellington toward Montevideo, reports high seas and squally weather experienced in latitude 53° 33' S., longitude 93° 59' W., on October 2. Fifth Officer F. G. Rogers states that the lowest barometric reading observed was 29.11 inches (corrected), at 8 a. m., wind NW. by N., force 7; shifts N. by W., NW. by N., and NW. backing gradually to W.